Remarks

The Office Action mailed August 15, 2003 has been received and reviewed. No claims have been amended or cancelled. Therefore, claims 1, 6-24, 27 and 29-58 are pending in the present application. Reconsideration and withdrawal of the rejections are respectfully requested in view of the remarks provided herein.

The 35 U.S.C. §103 Rejection

Claims 1, 6, 9-10, 16, 24, 29, 33, 41, 43 and 58

The Examiner rejected claims 1, 6, 9-10, 16, 24, 29, 33, 41, 43 and 58 under 35 U.S.C. §103(a) as being unpatentable over Michener et al. (U.S. Patent No. 4,745,543) in view of Harrow et al. (U.S. Patent No. 5,375,199). Applicants respectfully traverse the rejection of the claims.

In each of independent claims 1, 24, and 58, Applicants teach a graphical user interface for providing real-time process information to a user with regard to a process that is operable under control of one or more process variables. Generally, the graphical user interface includes a scale extending along a gauge axis and one or more bars extending along the gauge axis. Each bar is representative of a set of high and low process limit values for a process variable. For example, as described in claim 1, the one or more bars extending along the gauge axis include:

a first bar extending along the gauge axis, wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set; and

a second bar extending along the gauge axis, wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, wherein the

first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate.

Further, generally, such independent claims include a graphical shape displayed along the gauge axis representative of a current value of the process variable. Independent claims 24 and 58 include similar limitations.

It is to be noted that certain terms used in the claims have been further defined by the previous amendment even though such terms had already been defined in the specification. For example, the following description is given in the specification for various "limit" terms:

> As used herein, engineering physical limit values refer to limit values that define the physical limits of a piece of equipment or instrumentation. They represent the widest possible range of meaningful quantification of a process variable. For example, there may be engineering physical limits to measurements that a sensor may be able to provide.
>
> As used herein, engineering hard limit values are those limit values set by a user, particularly a control engineer, to establish a range over which an operator or another user can safely set operator set limit values.
>
> As used herein, operator set limit values are limit values through which operators exert influence on the controller 14. Such limits establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom.
>
> Lastly, as used herein, optimization soft limits, or otherwise referred to herein as delta soft bands, are pseudo limits describing an offset within the operator set limits that the optimization calculations will attempt to respect.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations.

Applicants respectfully submit that Michener et al. and Harrow et al. fail to teach or suggest all the claim limitations of the independent claims 1, 24, and 58. For example, Michener et al. and Harrow et al. fail to teach or suggest displaying a first bar extending along the gauge

axis (i.e., wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, and further wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set) and a second bar extending along the gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate), as provided in each of such claims.

Michener et al., as summarily described in column 2, line 62 through column 3, line 5, merely provides a display panel that defines first and second parallel bar graph indicators having a common scale (i.e., the bar graph indicators are parallel to the vertical scale), a third bar graph indicator having a separate scale, and a digital indicator. The first indicator displays the process variable in analog terms, the second indicator displays the set point in analog terms and the third indicator displays the output in analog terms.

The only process related values described in Michener et al. with relation to the common scale are the process variable value and the set point. Michener et al. does not display a first bar extending along the gauge axis (i.e., wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, and further wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set). Further, Michener et al. does not describe a second bar extending along the gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate).

It appears that the Examiner equates the display of a first bar extending along the gauge axis (i.e., wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, and further wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set) to the scale of 0-100 in Michener et al. This is clearly inappropriate. The values 0 and 100 on the scale have in no manner been described by Michener et al., and it is not taught or suggested by Michener et al., that such values are engineering hard limit values that establish a range over which an operator or another user can safely set operator set limit values (e.g., engineering hard limit values set by a user, particularly a control engineer). The 0 and 100 are merely part of a 0-100% scale and are not functional limit values. They are not indicated as being a limit on anything, upper or lower, for the process variable. In fact, they could be anything, including an upper physical limit for a particular sensor that controls the process variable.

In addition, Michener et al. does not even show a bar that extends along a gauge axis (i.e., a gauge axis along which a scale extends). Rather, Michener et al. merely shows a scale which lines graduating the same. Nothing more is shown extending along the scale, except for a bar graph indicator 22 indicative of the process variable.

Further, it appears that the Examiner equates the scale values (e.g., in much the same manner as equated with respect to Applicants' first bar) and the switches S3 and S4 as described in column 5 of Michener et al. to a second bar extending along the gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate).

However, such a comparison is not understood. Switches S3 and S4 do not describe a first end of the second bar representative of the operator set high limit for the process variable and a second end of the second bar representative of the operator set low limit for the process

variable; nor does Michener et al. describe the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate, as described in the pending claims. The switches S3 and S4 carry out control functions as described in Michener et al. (e.g., the switches are used to control the set point). For example, operation of one of the switches causes an increase in the set point while the other causes a decrease in the set point. Although, it would appear that the single set point value indicated by the bar graph gets increased or decreased, this in no manner can be construed to be a display of a first end of the second bar representative of the operator set high limit for the process variable and a second end of the second bar representative of the operator set low limit for the process variable; nor a first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate, as described in the pending claims. Rather, the set point is a single value that the operator wants the process to achieve.

Further, the Examiner recognizes that Michener et al. does not show a graphical shape displayed along the gauge axis representative of a current value of the process variable. However, the Examiner alleges that Harrow et al. describes such elements. As Michener et al. does not teach or suggest various elements of the claims as described above, Applicant generally traverses the Examiner's allegations regarding Harrow et al., and points out that the elements lacking in Michener et al. (e.g., a first bar extending along the gauge axis (i.e., wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, and further wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set) and a second bar extending along the gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set

high and low limits define a range in which the process is free to operate), are also not described, taught or suggested in Harrow et al.

Harrow et al. recites a system monitoring device that displays historical or real time information and also allows a user to set, via direct manipulation, a range of values for use by the system. For example, a user interface allows the user to expand the value of an interactive icon 200. The exemplary interactive icon 200 is illustrated in its expanded state on the graph in FIG. 13A where the user can move the range of values along the y-axis by dragging the slider 202 of the interactive icon 200 to change values associated with the interactive icon 200. Harrow et al. indicates that the interactive icon 200 . . . allows a user to set a range of values in relationship to graphically presented data. (Col. 17, line 68 – Col. 18, line 2). In its default condition, the indicator bar 204 of the interactive icon supplies a single crossing threshold represented by a thin line (Col. 18, lines 12-16) for a variable (i.e., CRC errors per hour). Thus, the indicator bar 204 provides a single limit value for a particular variable, i.e., CRC errors per hour.

According to Harrow et al., a user can expand the value of the interactive icon 200 (i.e., the indicator bar 204) into a range of values so that the single limit value for the variable (i.e., CRC errors per hour) is a range designated for control of an alarm. For example, 206 in Figure 13A of Harrow et al. indicates that "46" is the value at which "SOUND ALARM WHEN VALUE RISES ABOVE", and 208 in Figure 13A indicates that "26" is the value at which "CANCEL ALARM WHEN VALUE FALLS BELOW". As such, the values shown at 206 and 208 of Harrow et al. represent an expanded range of values for a single operator limit value used to provide alarm function. In other words, Harrow et al. provides an alarm range at the upper operator limit for the variable being monitored (e.g., CRC errors per hour). Harrow et al. does not show "operator set high and low limit values."

Contrary to Michener et al. and Harrow et al., the present invention provides a first bar extending along the gauge axis that includes a first end and second end representative of the engineering hard high and hard low limits and which define a range in which operator set high and low limits are set. Further, the present invention provides a second bar extending along the

gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate). As defined in the specification, such operator set limit values are limit values through which operators exert influence on the controller. Such limits establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom. The operator set limit values fall within a range established by the engineering hard limit values. In other words, the engineering hard limit values are those limit values set by a user, particularly a control engineer, to establish a range over which an operator or another user can safely set operator set limit values.

The limits discussed in Harrow et al. are clearly only focused on a single operator limit (i.e., a high limit designated as line 204) for a variable (e.g., CRC errors per hour). A user can provide a range at this high limit to control some other activity (i.e., an alarm) through the designation of several values (i.e., 206 and 208) at the single operator limit, but there is no description of operator set high and low limit values that establish the range in which the control solution is free to act when it is afforded sufficient degrees of freedom. In other words, the values in Harrow et al. are only pertinent to a single operator limit and an alarm range associated therewith, and not operator set high and low limit values.

Michener et al. is clearly focused on providing information with respect to the set point and the process variable value. There is no description in Michener et al., nor does Michener et al. teach or suggest, engineering hard high and low limit values or operator set high and low limit values that establish the range in which the control solution is fee to act. Nor do such references show the use of bars representative of such values.

As such, Michener et al. and Harrow et al. fail to teach or suggest, besides other things, both a first bar extending along the gauge axis (i.e., wherein a first end of the first bar is representative of an engineering hard high limit for the process variable and a second end of the first bar is representative of an engineering hard low limit for the process variable, and further

wherein the first end and second end of the first bar representative of the engineering hard high and hard low limits define a range in which operator set high and low limits are set) and a second bar extending along the gauge axis (i.e., wherein a first end of the second bar is representative of the operator set high limit for the process variable and a second end of the second bar is representative of the operator set low limit for the process variable, and further wherein the first end and second end of the second bar representative of the operator set high and low limits define a range in which the process is free to operate), as provided in each independent claim.

Further, in addition to Michener et al. and Harrow et al. failing to teach or suggest all of the claim limitations as clearly set forth above, there is no teaching or suggestion in either of the references that would motivate one skilled in the art to make a modification to Michener et al. using the teachings of Harrow et al. as alleged by the Examiner so as to arrive at the present invention. The Examiner alleges that it would have been obvious to one skilled in the art, having the teachings of Michener et al. and Harrow et al. before them to modify Michener et al. with elements of Harrow et al. "in order to allow the user to exploit their strengths in detecting and resolving process abnormalities as taught by Harrow et al."

However, as explained above, neither Michener et al. nor Harrow et al. show the various limitations of the claims as alleged by the Examiner. As such, no modification would provide the present invention as described in the accompanying claims.

For at least the above reasons, independent claims 1, 24, and 58 are not obvious in view of the cited references.

With respect to claims 6, 9-10, 16, 29, 33, 41, and 43, Applicants respectfully submit that these claims are also patentable as further limitations of respective patentable base independent claims from which they directly or indirectly depend. Furthermore, such claims are each patentable over Michener et al. and Harrow et al. based on the subject matter recited respectively therein and Applicant generally traverses the allegations that such claims are obvious over the cited references.

Based on at least the forgoing reasons, the Office Action fails to establish a *prima facie* case of obviousness for the rejection of the pending claims 1, 6, 9-10, 16, 24, 29, 33, 41, 43 and 58. Applicants respectfully request reconsideration and allowance of such claims.

Claims 11-15, 17-19, 34-40, 42 and 44-45

The Examiner also rejected claims 11-15, 17-19, 34-40, 42 and 44-45 as being unpatentable over Michener et al. in view of Harrow et al. and further in view of Schaefer et al. (U.S. Patent No. 4,675,147). The Examiner further rejected claims 20-23 and 46-48 as being unpatentable over Michener et al. (U.S. Patent No. 4,745,543), in view of Harrow et al. (U.S. Patent No. 5,375,199) and further in view of van Weele et al. (U.S. Patent No. 5,631,825). Applicants respectfully traverse the rejection of each of the claims.

For claims 11-15, 17-23, 34-40, 42 and 44-48, Applicants respectfully traverse the rejections and repeat the arguments presented above given for the independent claims from which these claims directly or indirectly depend. Further, such claims are also patentable in view of their own limitations.

Based on at least the forgoing reasons, the Office Action fails to establish a *prima facie* case of obviousness for the rejection of the pending claims 11-15, 17-23, 34-40, 42 and 44-48. Applicants respectfully request reconsideration and allowance of such claims.

Allowable Subject Matter

Applicants acknowledge the Examiner's indication that claims 49-57 are allowed.

Applicants further acknowledge the Examiner's indication that claims 7-8, 27, and 30-32 are objected to as being dependent on a rejected base claim, but that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, Applicants have not rewritten the claims in independent form as it is believed that the claims upon which they depend are also in allowable condition. However, Applicants reserve the right to rewrite such claims at a later date.

Summary and Request for Examiner Interview Prior to Disposition of Case

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. It would appear that the Examiner is still unclear as to the limitations of the present invention and does not recognize the differences between Applicants' invention and the cited references. It is requested that the Examiner contact Applicants' Representatives at the below-listed telephone number if the case is not allowed to discuss the prosecution of this application when it is taken up for consideration.

Respectfully submitted for
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<u>CERTIFICATE UNDER 37 CFR §1.8</u>:

The undersigned hereby certifies that the Transmittal Letter and the paper(s) and/or fee(s), as described hereinabove, are being deposited with the United States Postal Service as first class mail, in an envelope addressed to: Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 17th day of Nov., 2003.

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